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June 4, 2020

Arthur Burbank
USDA Forest Service
4350 South Cliffs Dr.
Pocatello, ID 83204

Subject: **Biological Selenium Removal Treatment Technology**
Water Treatment Pilot Study
Iron Coprecipication Full-Scale Pilot Response to Comments

Dear Art,

Attached are the responses to your comments provided June 1 on implementation of the iron coprecipitation full-scale pilot process within the Hoopes TSP.

Implementation of the iron coprecipitation full-scale pilot process within the Hoopes TSP is proposed to start in June 15, 2020 depending upon the review period of these response to comments letter.

Please contact me if there are questions regarding this response letter.

Sincerely,

Jeffrey Hamilton
Environmental Engineer

cc:

Sherri Stumbo – USFS, email only
Jennifer Crawford – USEPA, email only
Sandi Fisher – USFWS, email only
Ryan Braham – USFWS, email only
Kelly Wright –Shoshone-Bannock Tribes, email only
Susan Hanson – Shoshone-Bannock Tribes, email only
Brady Johnson – IDEQ, email only
Colleen O'Hara – BLM, email only
Jennifer Crawford – USEPA, email only
Gary Billman – IDL, email only
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Jon Witt – J.R. Simplot Company, email only
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Ron Quinn – J.R. Simplot Company, email only
Delmer Cunningham – J.R. Simplot Company, email only
Andy Koulermos – Formation Environmental, email only
Lily Vagelatos – Formation Environmental, email only
Jeremy Aulbach – Brown and Caldwell, email only

Specific Comments and Responses:

SC-1 Is the selenium present as selenite or selenate, or some combination of both?

R-1 The selenium in the effluent is present as mostly selenite with a lesser percentage as selenate. The iron coprecipitation will not target the selenate in a meaningful way.

SC-2 What is the pH of the activated sludge basins?

R-2 The pH in the aeration tanks is ~8.0.

SC-3 Precipitation of ferric oxyhydroxides releases protons. How will the pH of the activated sludge be controlled?

R-3 Trial work showed that the system has adequate buffering capacity to receive the ferric chloride dose without lowering the system pH more than 0.5 pH units.

SC-4 Will the effluent from the tanks require pH modification prior to discharge?

R-4 Trial work showed that pH modification was not required prior to discharge. Effluent pH is frequently monitored.

SC-5 What would be the final overall percentage of selenium removal?

R-5 This is to be determined, but trial work indicates that this additional step could increase the overall percentage of selenium removal above 90%.

SC-6 Would the system meet water quality limits with this additional step?

R-6 This is to be determined, but trial work indicates that this additional step could increase the overall percentage of selenium removal above 90%. Other COCs will continue to be monitored to ensure that the water quality limits for those constituents continue to be met.

SC-7 Were jar tests conducted with water from the activated sludge system that also contained the phosphoric acid?

R-7 Yes, a trial was performed using activated sludge which also contained the phosphoric acid feed.

SC-8 Has there been consideration of how the new composition of the returned sludge (Figure 3-8 of the workplan) will influence required phosphoric acid dosing?

R-8 Yes, process modeling and trial operations were performed to evaluate biomass performance with the increased iron dosing. At this point, the phosphoric acid dosing is not planned to be altered.

SC-9 The memo notes that the solids generated will be of higher density and that the "clarifier operations will be monitored to evaluate the ability of the clarifier to handling [sic] the higher sludge density." What is planned if the clarifier is unable to handle the higher

density sludge?

R-9 Several options exist if the clarifier has difficulty removing the higher density biomass. These include increasing the RAS rate, modifying the inlet orifice in the suction header, adding a second sludge scraper, or eliminating the iron coprecipitation process.

SC-10 Will a plan be in place prior to commencing the ferric chloride addition to deal with the higher density sludge?

R-10 Yes, in this initial trial, increasing of the RAS rate is planned if the clarifier has difficulty handling the higher density biomass. If this is unable to improve performance, the trial would be stopped. Next steps would potentially include modifications to the clarifier sludge withdrawal header.

SC-11 It isn't clear how the biosolids removed from the FBR are to be dewatered. It appears that some of the biomass enters the post-treatment activated sludge tanks/basins, but it is not clear how much. Please clarify this.

R-11 No changes will be made to the FBR solids dewatering. The FBR solids are currently comingled with the post treatment solids and dewatered together via centrifuge.

SC-12 Has inclusion of a nano-filtration step prior to the FBR effluent going to the post-treatment tanks been considered?

R-12 It has been discussed, but no formal evaluations of the addition of nano-filtration have been performed.

SC-13 Has a long-term cost analysis been done to compare that potential mitigation measure with the currently proposed one?

R-13 No long-term cost analysis has been performed to compare the addition of nano-filtration prior to the aeration basins.